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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Akihiro Omori

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EXAMINER

BASS, DIRK R

ART UNIT

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1777

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/582,339	Applicant(s) OMORI ET AL.	
	Examiner DIRK BASS	Art Unit 1777	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14, 20-31 and 53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 20-31, 53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's request for continued examination filed February 16, 2011 is acknowledged. Claim 1 is amended and claims 15-19 and 32-52 are withdrawn from consideration. Claims 1-14, 20-31, and 53 are pending and further considered on the merits.

Response to Amendment

In light of the response, the examiner maintains the grounds of rejection set forth in the office action dated November 16, 2010.

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. **Claims 1-3, 5-6, 8-14, 20 and 53** are rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya et al., JP 09-187646 (Motoya) in view of Omori et al., US 6689465 (Omori).
3. Regarding claim 1, Motoya discloses an adsorbent article for filtration of impurities (¶ 0004) comprising an organic polymer resin and an inorganic ion absorbing material, said inorganic ion absorbing material being supported on the outer surface of said adsorbent article (¶ 0005).
4. Motoya fails to explicitly disclose that the article is porous and has inorganic ion absorbing materials formed within the cavities of a porous article. However, Omori discloses a porous bead comprising an organic polymer resin having gaps between fibrils forming a communicating pore, at least a part of said fibrils having a cavity in the interior of each fibril (abstract, fig. 13, and col. 4, l. 52-57).
5. At the time of invention, it would have been obvious to modify the adsorbent article of Motoya to include the porous bead of Omori since it has been shown that such porous beads are useful for filtration of large quantities of hot water and for adsorption of impurities contained in the hot water (Omori, col. 3, l. 20-24). Furthermore, it would have been obvious to one skilled in the art to include the inorganic ion absorbents of Motoya within the pores of said bead in order to increase the adsorbing efficiency of said bead.

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6. Regarding claim 2, Omori further discloses that said porous bead has pores having a maximum pore diameter in a layer in the vicinity of the surface of said bead (col. 22, l. 5-8).

7. Regarding claim 3, Omori further discloses that said porous bead has an average particle diameter of 100 to 2,500 μm (abstract).

8. Regarding claims 5-6 and 8, Motoya in view of Omori disclose the inorganic ion absorbing material comprises a hydrated oxide of titanium (§ 0007) and has a particle diameter of 0.01 to 100 μm (§ 0008).

9. Regarding claim 9, Motoya in view of Omori discloses an article wherein the inorganic ion absorbing material is an amount of 30 to 95% is supported thereon (§ 0010).

10. Regarding claims 10-12, Motoya in view of Omori discloses an article wherein the fibril comprises the organic polymer resin, inorganic ion absorbing material and water soluble polymer, said water soluble polymer being polyvinylpyrrolidone (§ 0009-0010).

11. Regarding claim 13, while Motoya in view of Omori fail to disclose a porous article wherein the water soluble polymer is in an amount of 0.001 to 10%, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have the claimed range of water soluble polymer contained therein, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (MPEP 2144.05, Section II, Part A).

12. Regarding claims 14, 20, and 53, Omori further discloses that said porous beads can be packed into a column (col. 11, l. 46-52).

13. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya in view of Omori as relied upon in claim 1, and in further view of Chang et al., US 5418284 (Chang).

14. Motoya in view of Omori fail to disclose an article comprises polyacrylonitrile. However, Chang discloses polyacrylonitrile beads (abstract) useful for chromatographic separations (col. 1, l. 49-51).

15. At the time of invention, it would have been obvious to one skilled in the art to modify the porous formed article of Motoya in view of Omori to include the composition of Chang in order to use a well known material for an ion exchange column adsorbent.

16. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya in view of Omori as relied upon in claim 1, and in further view of CHEREMISNIOFF, Handbook of Water and Wastewater Treatment Technology.

17. Motoya in view of Omori fail to explicitly disclose that the inorganic material includes activated carbon impregnated with aluminum sulfate. However, Cheremisnioff discloses that activated carbon impregnated with aluminum sulfate is a commonly known coagulant for water treatment (pg. 136). Therefore, it would have been obvious to a person having ordinary skill in the art to include a well known coagulant for water treatment in the porous article used for water treatment of Motoya in view of Omori.

18. **Claims 21-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Motoya in view of Omori as relied upon in claim 1, and in further view of Kazuhiko, JP 2003-305458 (Kazuhiko).

19. Regarding claims 21-24, Motoya in view of Omori discloses the ion absorbent for removing ions from waste water as shown in the rejections above but fails to explicitly disclose the treatment apparatus. However, Kazuhiko discloses a pH controlling device (fig. 3-5, REF 21) and membrane separation device (§ 0023 and REF 22/23) are installed in a stage before the column (REF 2); and the ion adsorbing device includes water sending means for supply a desorption liquid to the column (REF 3 and P).

20. At the time of invention, it would have been obvious to one skilled in the art to modify the ion adsorbent of Motoya in view of Omori to include the treatment apparatus of Kazuhiko since it naturally flows that a routineer in the art would have motivation to include waste water treatment apparatus with an ion absorbent for use in waste water treatment.

21. Regarding claims 25-26, Kazuhiko further discloses a crystallization tank (REF 11), adding means for adding a crystallizing agent (REF 14), a crystallizer provided with stirring means (§ 0022), and a membrane separation device (§ 0023 and REF 22/23) for separating precipitates.

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22. Regarding claims 27-28, Kazuhiko discloses liquid supplying means (REF 15/3, ¶ 0024, 0044, 0046, 0048, 0050, and Table 1) for supplying an alkaline liquid and for supplying a pH adjusting liquid which is obtained by separating a liquid from a solid after a crystallization reaction (REF 11, 18) to a column (REF 2).

23. Regarding claim 29, Kazuhiko discloses a pH adjusting tank (REF 18), a pH meter (controller), a chemical liquid injection pump working with the pH controller, pH adjusting liquid supplying means, and a line (REF 3) for passing water in the pH adjusting tank to the column (¶ 0044, 0046, 0048), where it is implicit that the pH adjuster line present in tank (REF 18) includes a pump and pH adjusting liquid supplying means shown in part 10 of the apparatus (¶ 0040).

24. Regarding claim 30, Kazuhiko further discloses liquid supplying means for supplying wash water to the column (¶ 0014).

25. Regarding claim 31, Kazuhiko discloses a pH adjusting means (REF 9) for adjusting pH of treatment water flowing out from the column.

Response to Arguments

26. Applicant's arguments with respect to claim 1 have been considered but are not persuasive.

27. Applicant continues to argue that the porous polymeric bead of Omori does not comprise fibrils having cavities in the interior of each fibril. Applicant further states that Omori does not utilize the same method of producing a porous bead stated in applicant's specification, therefore the bead of Omori does not comprise inter-fibril cavities or pores. In response, the examiner considers the polymeric bead of Omori to inherently comprise fibrils having inter-fibril cavities or pores.

28. Omori discloses a method of forming the porous polymeric beads comprising mixing an organic resin with an organic solvent, dispersing the resin/solvent mixture in a non-solvent, and separating the solidified porous polymeric beads (C16/L37-61). During the process of mixing the organic resin with the organic solvent, a mixture of resin/solvent occurs with solvent being interspersed within the resin. When the resin/solvent mixture is dispersed in a non-solvent, the organic solvent leaves the resin during phase separation and not only forms a porous bead but also porous fibers

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making up said porous bead. Therefore, the examiner maintains that the combination of Motoya and Omori discloses the features recited in amended claim 1

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to a whose telephone number is (571) 270-7370. The examiner can normally be reached on Mon - Fri (9am-4pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Krishnan S Menon/
Primary Examiner, Art Unit 1777

/DRB/
Dirk R. Bass